

- (54) REMOVAL OF ILL EFFECTS I FLUORINE, BROMINE AND IODINE
 (11) 2-280815 (A) (43) 16.11.19) JP
 (21) Appl. No. 64-101540 (22) 24.4.1989
 (71) MITSUI TOATSU CHEM INC (72) HIROYUKI ITO(4)
 (51) Int. Cl⁵. B01D53/34, C01B31/20

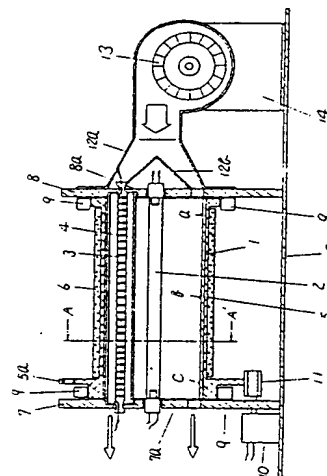
PURPOSE: To effect reductive absorption of halogen alone by adjusting to a specific pH range a mixed aq. soln. of the hydroxide and sulfite of alkali metals when it is used for the cleaning of a mixed gas of halogen and carbon dioxide.

CONSTITUTION: A liq. contg. the sulfite of alkali metals and/or alkaline earth metals such as lithium and sodium and the hydroxide of alkali metals and/or alkaline earth metals in the molar ratio of not more than 2 to the aforesaid sulfite, is used as a cleaning liq. A mixed gas of fluorine, bromine or iodine and carbon dioxide is washed with this cleaning liq., while its pH is being adjusted within the range of 1.9-6.3, whereby the fluorine, bromine or iodine can be removed from the mixed gas. By a simple and efficient removal in this way of the fluorine, bromine, etc., from the mixed gas over a wide pH range, a harmless halide results.

- (54) DEODORIZING APPARATUS BY PHOTOCATALYST
 (11) 2-280817 (A) (43) 16.11.1990 (19) JP
 (21) Appl. No. 64-100718 (22) 20.4.1989
 (71) MATSUSHITA ELECTRIC IND CO LTD (72) SHUZO TOKUMITSU(2)
 (51) Int. Cl⁵. B01D53/36, A61L9/00, B01D53/34

PURPOSE: To remove a high b.p. substance from the surface of a semiconductor by a method wherein a photocatalyst layer or heating body is so arranged as to permit the photocatalyst layer to be heated successively and wholly and wherein a deodorizing device is so arranged as to permit the photocatalyst layer and the heating body to be relocated.

CONSTITUTION: When an air blower 13 and an ultraviolet lamp 2 are on, the flow of the air contg. malodor take a place along a photocatalyst layer 1 by means of hoods 12a and 12b and baffle plates 7a and 8a. The malodorous components of the air are then irradiated with the ultraviolet rays from the ultraviolet lamp 2 so as to be decomposed for removal of the odor. To regenerate the photocatalyst layer 1, a deodorizing device is removed in a place filled with normal air and the air blower 13, a heating body 3 and a motor 10 are turned on to rotate a drum 5 and, at the same time, heat the photocatalyst layer 1. By one rotation, the photocatalyst layer 1 is regenerated wholly.



- (54) DEODORIZING BY PHOTOCATALYST
 (11) 2-280818 (A) (43) 16.11.1990 (19) JP
 (21) Appl. No. 64-100719 (22) 20.4.1989
 (71) MATSUSHITA ELECTRIC IND CO LTD (72) TOMOKO IKEDA(1)
 (51) Int. Cl⁵. B01D53/36, A61L9/00, B01D53/34

PURPOSE: To efficiently decompose the malodorous components of the air by irradiating a semiconductor catalyst such as consisting of tungsten oxide, titanium oxide, yttrium oxide, etc., with the ultraviolet rays having a wavelength of 250nm and an intensity of not less than 2.0 mW/cm²

CONSTITUTION: A semiconductor catalyst is formed of a metal oxide such as tungsten oxide, titanium oxide, yttrium oxide and tin oxide or their admixture. This semiconductor catalyst is irradiated with ultraviolet rays having a wavelength of 250nm and an intensity of not less than 2.0mW/cm² so as to be activated, thereby decomposing and removing the malodorous components of the air. In this example, the aforesaid semiconductor catalyst is formed by depositing about 300g/m² of the anatase type titanium dioxide obtained from a heat treatment at a temp. of 400-700°C on an alumina siliceous ceramic paper 30.3mm wide, 120mm long and 0.5mm thick and impregnated with titania sol.

⑩ 日本国特許庁(JP)

⑪ 特許出願公開

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⑮ 発明の名称 光触媒による脱臭方法

⑯ 特 願 平1-100719

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明 細 書

1. 発明の名称

光触媒による脱臭方法

2. 特許請求の範囲

波長250nmで紫外線強度が2.0mW/cm以上の紫外線を半導体触媒に照射し、大気中の悪臭成分を分解する光触媒による脱臭方法。

3. 発明の詳細な説明

産業上の利用分野

本発明は、家庭やオフィス内の悪臭(調理臭・食品臭・たばこ臭・体臭・ペットおよびトイレの臭いなど)の脱臭のため用いられている光触媒の脱臭方法に関するものである。

従来の技術

家庭やオフィス内で発生する悪臭(調理臭・食品臭・たばこ臭・ペットおよびトイレの臭いなど)の成分は、窒素化合物(アンモニア・アミン類・インドール・スカトールなど)、硫黄化合物(硫化水素・メチルメルカプタン・硫化メチル・二硫化メチル・二硫化ジメチル等)、アルデヒド

類(ホルムアルデヒド・アセトアルデヒドなど)、ケトン類(アセトンなど)、アルコール類(メタノール・エタノールなど)、脂肪酸および芳香族化合物など、多種多様である。

従来、このような悪臭を脱臭する方法として、悪臭物質と薬剤とを化学反応させる方法、芳香剤で悪臭物質をマスキングする方法、活性炭やゼオライトなどで悪臭物質を吸着する方法および、これらの方法を組み合わせて用いる方法があった。以上のように様々な脱臭方法が使用されているが、薬剤や芳香剤は共に悪臭物質と反応した後、再生はほとんど不可能である。また、吸着剤の場合も吸着容量が飽和すると脱臭性能は著しく低下する。従って、どの場合においても、定期的に新しいものとの交換が必要になってくる。

このような煩わしい操作の頻度を大幅に減少あるいはこの操作そのものが不要でなくなる脱臭方法として、酸化チタン等の半導体に紫外線を照射し、それによって励起された半導体が有機物などを酸化分解する光触媒の利用が試みられている。

発明が解決しようとする課題

光触媒を用いた脱臭方法では一般的によく使用されている活性炭で、脱臭が困難なアセトアルデヒド類およびその他の悪臭物質を効果的に脱臭し、また、長期間その性能の維持を可能とする方法が検討されている。この場合、光触媒を実際の各種脱臭器に組み入れ、設計する際、光触媒反応を最も効率よく起こす紫外線強度と半導体触媒の関係が判明しておらず支障を来していた。この設計因子を取り入れず脱臭機器を作成した場合、反応効率の悪い脱臭器のできる可能性が大きく、充分その性能を発揮できない。また、半導体触媒も活性が最高状態に達しないため、別の臭いを持つ中間生成物が発生すると共に悪臭物質による劣化が生ずるものである。

本発明はこのような従来の課題を解決するものであり、光触媒反応を最も効率よく起こす紫外線強度と半導体触媒の関係を把握し、このような条件を満たす光触媒による脱臭方法を提供することを目的とするものである。

ンが生じ、これらが悪臭物質を酸化分解するものと推測される。半導体触媒分子1個が光触媒として活性化するエネルギーは決まっているが、波長250nmの紫外線強度が 2.0mW/cm^2 以上あれば半導体触媒を光触媒として最も活性化した状態で利用することができる。

実施例

以下、本発明の実施例について説明する。

光触媒として用いる半導体は、単独の金属酸化物及びそれらの混合物である。代表的なものとして、酸化タンゲステン・酸化チタン・酸化イットリウム・酸化スズなどがある。本実施例に用いる紫外線は、高圧水銀灯・超高圧水銀灯・低圧水銀灯・キセノン灯などを単独または、併用して用いることにより発生させることができる。同様に半導体光触媒は、光源表面に塗布するか、光源の周囲に支持体を設けてそれに塗布または、含浸するなどして使用する。

次に、具体的な実施例について詳細に説明する。実施例で使用した光触媒は、幅30.3mm、長さ

課題を解決するための手段

本発明は、上記目的を達成するために、波長250nmで紫外線強度が 2.0mW/cm^2 以上の紫外線を半導体触媒に照射し、大気中の悪臭成分を分解する光触媒による脱臭方法とするものである。

作用

本発明者などは、光触媒による悪臭分解・無臭化を研究中であるが、半導体触媒による光触媒反応と紫外線強度の関係を検討していくうち、波長250nmで紫外線強度が 2.0mW/cm^2 までは、紫外線強度の増加に伴い光触媒活性も増加するが、それ以上紫外線強度を上げて活性は増加せず一定の値を示すことを見いだした。

光触媒の作用原理は、現在詳細に検討中であるが、半導体触媒である混合金属酸化物の価電子帯の電子が紫外線照射によりエネルギーを得、伝導帯に励起され、そこで生じた価電子帯の正孔は、触媒表面に吸着している水からの水酸基と反応し、伝導帯に励起された電子は酸素と反応して、活性の高いOHラジカル・Oラジカル・O₂イオ

120mm、厚さ0.5mmのアルミナ-シリカ質のセラミックペーパーにチタニアゾルを含浸した後、400-700℃で熱処理し、アナターゼ型二酸化チタンを約 300g/m^2 担持して作成する。

この触媒1を第1図に示す反応器2に設置し、アルミニウムテープでその反応器を密閉する。次に、栓3を開き栓4を閉じた状態で、空気5及び試験ガス6のポンペを開き、混合器7の中で混合させた後、予備サンプリング口8より混合ガスをサンプリングしガスクロマトグラムで濃度分析しながら試験ガス濃度を調整する。ここでの試験ガスは、アセトアルデヒドを用いる。濃度は15ppm付近、流量は 2l/min である。濃度調整が完了した後、光源9を照射する。光源9は、紫外線強度が、 3.0mW/cm^2 以下の場合は殺菌灯としてGL-10(10W、三共電気)を用い、 3.0mW/cm^2 の場合は殺菌灯としてGL-15(15W、三共電気)を用いた。紫外線強度の調整は、光源と石英板の間の距離を調整することで行った。光源9を照射し5分間放置した後、栓4を開き栓3を閉じて5

分間放置する。次に、入口サンプリング口10、出口サンプリング口11よりそれぞれ5mlサンプリングし、ガスクロマトグラムで濃度分析を行う。この操作を10分間隔で、120分間行い分解率の経時変化を求める。各紫外線強度での平均分解率は、分解率が安定した部分での平均値であり、次の式で求めた。

$$\text{分解率} = 1 - K$$

$$K = \frac{\text{出口サンプリング濃度}}{\text{入口サンプリング濃度}}$$

第2図に、紫外線強度と平均分解率の関係を示す。図は縦軸に平均分解率を、横軸に紫外線強度を示している。この図からも明らかなように、平均分解率は、紫外線強度2.0mW/cm²までは紫外線強度に比例して増加するが、それ以上紫外線強度が増加しても、平均分解率は増加しない。つまり二酸化チタンの触媒の活性は、紫外線強度が2.0mW/cm²以上の光エネルギーで最高状態が得られるということが分かる。

発明の効果

脱臭器に取り付けられている半導体触媒に紫外線が、波長250nmで、外線強度が2.0mW/cm²以上照射されるよう設計すれば、触媒が少量ですむためコンパクトな脱臭器で大気中の悪臭成分を効率よく分解するうえ、光触媒の劣化が防止でき、脱臭器の長期使用が可能になる。また、光触媒が充分活性化され反応を起こすので、別の臭いを持つ中間生成物などの発生が減少する。

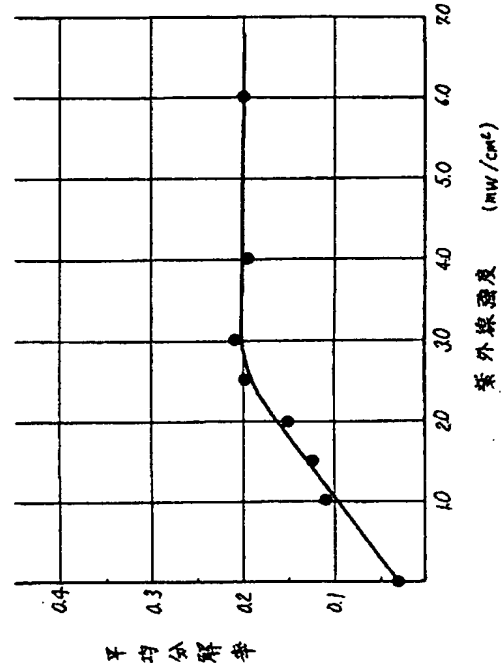
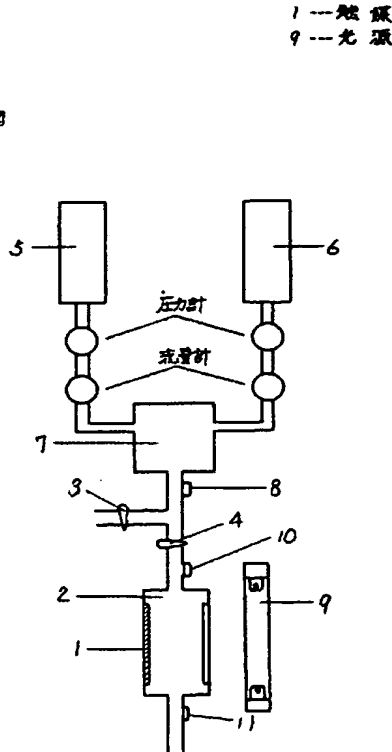
4. 図面の簡単な説明

第1図は本発明の実施例に使用した光触媒反応の試験装置を示す概略図、第2図は、同紫外線強度と平均分解率の関係を示すグラフである。

1…触媒、9…光源。

代理人の氏名 弁理士 栗野重孝 ほか1名

第1図



第2図

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
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DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application]

This design is related with the refrigeration system with a deodorization machine for automobiles which adjusted the temperature of the air which deodorized while removing the nasty smell from the air of the automobile interior of a room auxiliary.

[0002]

[Description of the Prior Art]

Particles, such as smoke of a cigarette and dust, are floating, and since such a particle does not have giving [little] crew displeasure, there is a thing (JP,62-90,818,U) equipped with the thing (JP,50-59,750,U) and JP,63-43,930,U by which the air pure filter was attached in the conditioner for automobiles in recent years, and the air cleaner which removes a particle using static electricity and defecates air in the automobile interior of a room.

[0003]

As this kind of air cleaner is shown in drawing 3, it has the case main part 4 which consists of vertical cases 2 and 3, and ***** 6 which breathes out the air which defecated to the vehicle interior of a room is formed in the inhalation mouth 5 which inhales vehicle indoor air, and the upper surface at the side of the upper case 2. In the case main part 4, an air duct 7 is formed between the inhalation mouth 5 and an outlet 6, and the multi-profile centrifugal fan 9 driven by the motor 8 is formed in this air duct 7. And after the air introduced from the inhalation mouth 5 by this multi-profile centrifugal fan 9 is led to an air duct 7, it is breathed out from an outlet 6. Moreover, in the air duct 7, the electrostatic filter 10 and charcoal filter 11 for defecating the inhaled air are built in. This electrostatic filter 10 is formed in the position close to the inhalation mouth 5, and electrifies a particle on negative voltage in corona discharge, and dust is collected for it by adsorbing this electrified particle electrically. On the other hand, the charcoal filter 11 is formed in the downstream of the electrostatic filter 10, and removes the odor contained to inhalation air by the absorption by activated carbon. Furthermore, in the case main part 4, the amplifier 12 which supplies the drive power of a motor 8 and the power for corona discharge of the electrostatic filter 10 is incorporated, it connects with the switch 13 formed in the upper part of the upper case 2, and this amplifier 12 is performing ON/OFF operation of an air cleaner, adjustment of the strength of an air content, etc. with this switch 13. Such an air cleaner is installed on the rear package tray of the vehicle interior of a room etc. In addition, the sign in drawing "15" shows the anion generator attached near the outlet 6.

[0004]

[Problem(s) to be Solved by the Device]

however, since an air cleaner is used through one year regardless of a season, it has a dehumidification function -- **** (JP,62-90,818,U) -- it is inadequate Moreover, since the evaporator used when performing air conditioning and dehumidification causes a nasty smell, this cure is also needed. This design is made in view of the trouble of such conventional technology, is equipped with a deodorization

function and an air conditioning function, and its deodorization efficiency is high and it aims at offering the refrigeration system with a deodorization machine which was moreover rich in endurance.

[0005]

[Means for Solving the Problem]

While this design for attaining the above-mentioned purpose establishes the open air inhalation mouth (21) which takes in outdoor air in a case (20), and the bashful inhalation mouth (22) which takes in indoor air. It prepares free [rotation of the intake door (23) which opens and closes these open air inhalation mouth (21) and a bashful inhalation mouth (22) alternatively]. The blower (25) which ventilates toward the outlet (24) which established the air introduced from the open air inhalation mouth (21) or the bashful inhalation mouth (22) in the case (20) is formed in a case (20). The evaporator (26) which cools the aforementioned introduction air to predetermined temperature, and the optical-pumping catalyst filter (27) which excites by long wavelength light and generates active oxygen are prepared in the air duct (28) within a case (20). It is the refrigeration system with a deodorization machine for automobiles characterized by preparing a ultraviolet ray lamp (29) between the aforementioned evaporator (26) and an optical-pumping catalyst filter (27).

[0006]

[Function]

Thus, if it is constituted this design, when the odor level of the vehicle interior of a room is more than constant value and the skin temperature of an evaporator (26) is the area within predetermined temperature, an intake door (23) is set as the bashful mode. Even if making temperature of an evaporator into the area within predetermined temperature cannot sense a nasty smell comparatively easily in the case of low temperature and it moreover irradiates a ultraviolet ray lamp at low temperature, deodorization efficiency is from a low. Next, a ultraviolet ray lamp (29) is irradiated and a blower (25) is operated. It excites, when these ultraviolet rays are irradiated by the optical-pumping catalyst filter (27), and active oxygen occurs. Even the oxidizability compound of the super-low concentration that whose it stinks it is lost carries out oxidative degradation of the matter to which this active oxygen releases the nasty smell included in the indoor air introduced from the bashful inhalation mouth (22). Moreover, simultaneously with this, since ultraviolet rays are irradiated by the evaporator (26), they sterilize the virus and bacterium adhering to the evaporator. The nasty smell generated from an evaporator can also be removed by this, consequently odorless harmony air will be indoors supplied from an outlet (24).

[0007]

[Example]

Hereafter, one example of this design is explained based on a drawing. The ** type view in which drawing 1 shows one example of this design, and drawing 2 are the flow charts explaining control of this example.

[0008]

First, the open air inhalation mouth 21 which introduces vehicle outdoor air into the case 20 of the refrigeration system with a deodorization machine concerning this example, and the bashful inhalation mouth 22 which introduces vehicle indoor air are established, and the intake door 23 which opens and closes these open air inhalation mouth 21 and the bashful inhalation mouth 22 alternatively is attached in the case 20 free [rotation]. The actuator 30 is connected with the rotation shaft of this intake door 23 through the link etc., and while PBR etc. detects the rotation position of an intake door 23 and outputting to control means 31, based on the command signal from control means 31, the intake door 23 is connected so that only a predetermined angle may be rotated. Moreover, although inhalation mode is determined by the rotation position of an intake door 23, even if this inhalation mode is two kinds of open air modes which carry out the close by-pass bulb completely of the bashful inhalation mouth 22 to the bashful mode which carries out the close by-pass bulb completely of the open air inhalation mouth 21, it may be three kinds of setup in the inside-and-outside mode which is half-open in the open air inhalation mouth 21 and the bashful inhalation mouth 22, respectively in addition to this.

[0009]

The blower 25 for ventilating a downstream in the air introduced from these inhalation mouths 21 and

22 is formed in the downstream of this open air inhalation mouth 21 and the bashful inhalation mouth 22.

A blower 25 consists of a fan 32 and a motor 33 made to rotate the fan 32 concerned at a predetermined rotational frequency, and it is connected so that the rotational frequency of the motor at the time of an operation / halt of a motor 33, and an operation may be determined by the command signal from control means 31.

[0010]

The evaporator 26 through which the refrigerant of an air conditioning cycle circulates is installed inside the downstream of a blower 25, and in case the air which flowed down with the blower 25 passes this evaporator 26, it is cooled by predetermined temperature by performing a refrigerant and a heat exchange. When circulation of the refrigerant to an evaporator 26 was performed by ON/OFF of the airconditioning switch of the controller formed in the vehicle interior of a room and an airconditioning switch turned on, while the refrigerant circulated to the evaporator 26 by turning on the electro magnetic clutch of the compressor which is not illustrated, when an airconditioning switch is turned off, an electro magnetic clutch is turned off and circulation of the refrigerant to an evaporator 26 is suspended. In addition, an air conditioning cycle consists of an expansion valve which carries out adiabatic expansion of the liquid tank and this high-pressure liquid cryogen for storing a part of compressor which carries out adiabatic compression of the refrigerant and is made to circulate through this as a gas refrigerant of elevated-temperature high pressure, capacitor which condenses this compression refrigerant, and liquid cryogen liquefied by this condensation, and is made into the liquid cryogen of low-temperature low voltage, and an evaporator 26 mentioned above. The optical-pumping catalyst filter 27 which becomes the air duct 28 of the downstream of an evaporator 26 from the optical-pumping catalyst which excites by irradiation of long wavelength light and generates active oxygen is formed. This optical-pumping catalyst filter 27 is excited by irradiation of the ultraviolet ray lamp 29 prepared between evaporators 26, and generates active oxygen, and even the oxidizability compound of the super-low concentration that whose it stinks it is lost carries out oxidative degradation of the matter to which this active oxygen releases a nasty smell.

[0011]

The ultraviolet ray lamp 29 concerning this example is formed in the air duct 28 between an evaporator 26 and the optical-pumping catalyst filter 27, and irradiates the ultraviolet rays which are long wavelength light at both sides of an evaporator 26 and the optical-pumping catalyst filter 27. If ultraviolet rays are irradiated on the other hand at an evaporator 26 although irradiation of the ultraviolet rays to the optical-pumping catalyst filter 27 has the deodorization effect of carrying out oxidative degradation of the nasty smell matter as mentioned above, it can sterilize a virus, a bacterium, etc. which were generated in the evaporator.

[0012]

The metal catalyst filter 34 which consists of a metal catalyst for removing the ozone contained in introduction air is formed in the downstream of the optical-pumping catalyst filter 27. Although it is because ozone's is very poisonous if it is inhaled between durability even if this has an odor, it will invade a breather if poisoning is strong and concentration is high, and it is a minute amount, the refrigeration system with a deodorization machine of this design is also omissible.

[0013]

"35" is a temperature sensor, and it is connected so that the skin temperature of an evaporator 26 may be detected and measurement data may be outputted to control means 31. Moreover, "36" is a stinking sensor, measures the odor level of indoor air, and it is connected so that this measurement data may be outputted to control means 31. In addition, "37" is a fan motor switch.

[0014]

Next, an operation is explained, referring to drawing 2. When the odor level detected by the stinking sensor 36 is more than the constant value X and the skin temperature of the evaporator 26 detected by the temperature sensor 35 is 15-50 degrees C, by PBR attached in the actuator 30 of an intake door 23, the rotation position of an intake door 23 is checked and it is set as the bashful mode (Steps 1-4). Even if

making temperature of an evaporator 26 into 15 degrees C or more cannot sense a nasty smell comparatively easily in the case of low temperature and it moreover irradiates a ultraviolet ray lamp at low temperature, deodorization efficiency is from a low.

[0015]

Next, a ultraviolet ray lamp 29 is irradiated and a blower 25 is operated (Steps 5-6). It excites, when these ultraviolet rays are irradiated by the optical-pumping catalyst filter 27, and active oxygen occurs. Even the oxidizability compound of the super-low concentration that whose it stinks it is lost carries out oxidative degradation of the matter to which this active oxygen releases the nasty smell included in the indoor air introduced from the bashful inhalation mouth 22. Moreover, simultaneously with this, since ultraviolet rays are irradiated by the evaporator 26, they sterilize the virus and bacterium adhering to the evaporator 26. The nasty smell generated from an evaporator 26 can also be removed by this, consequently odorless harmony air will be indoors supplied from an outlet 24. Moreover, in case the air which passed this optical-pumping catalyst filter 27 passes the metal catalyst filter 34, the ozone contained in the air concerned is removed, and it turns into still purer air, and is supplied indoors.

[0016]

Thus, if odor level becomes below the constant value X and the skin temperature of an evaporator 26 becomes higher than less than 15 degrees C or 50 degrees C, cooling to predetermined temperature removing the nasty smell in indoor air, while suspending irradiation of a ultraviolet ray lamp 29, a blower 25 is suspended, an intake door 23 is set as open air mode, and control of this example is ended (Steps 7-11).

[0017]

Thus, according to the refrigeration system with a deodorization machine of this example, since the cause of also performing sterilization of the evaporator used for air conditioning simultaneously with deodorization of indoor air, consequently generating a nasty smell is lost, it is no odor and the air moreover cooled by predetermined temperature can be supplied indoors.

[0018]

[Effect of the Device]

While establishing the open air inhalation [which takes in outdoor air in a case according to / like / this design] mouth described above, and the bashful inhalation mouth which takes in indoor air It prepares free [rotation of the intake door which opens and closes these open air inhalation mouth and a bashful inhalation mouth alternatively]. The evaporator which forms in a case the blower which ventilates toward the outlet which established in the case the air introduced from the open air inhalation mouth or the bashful inhalation mouth, and cools introduction air to predetermined temperature, Since the optical-pumping catalyst filter which excites by long wavelength light and generates active oxygen was prepared in the air duct within a case and the ultraviolet ray lamp was prepared between the evaporator and the optical-pumping catalyst filter Since the cause of also performing sterilization of the evaporator used for air conditioning simultaneously with deodorization of indoor air, consequently generating a nasty smell is lost, it is no odor and the air moreover cooled by predetermined temperature can be supplied indoors.

[Translation done.]

* NOTICES *

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1. This document has been translated by computer. So the translation may not reflect the original precisely.
2. **** shows the word which can not be translated.
3. In the drawings, any words are not translated.

 CLAIMS

[Utility model registration claim]

[Claim 1] While establishing the open air inhalation mouth (21) which takes in outdoor air in a case (20), and the bashful inhalation mouth (22) which takes in indoor air It prepares free [rotation of the intake door (23) which opens and closes these open air inhalation mouth (21) and a bashful inhalation mouth (22) alternatively]. The blower (25) which ventilates toward the outlet (24) which established the air introduced from the open air inhalation mouth (21) or the bashful inhalation mouth (22) in the case (20) is formed in a case (20). The evaporator (26) which cools the aforementioned introduction air to predetermined temperature, and the optical-pumping catalyst filter (27) which excites by long wavelength light and generates active oxygen are prepared in the air duct (28) within a case (20). The refrigeration system with a deodorization machine for automobiles characterized by preparing a ultraviolet ray lamp (29) between the aforementioned evaporator (26) and an optical-pumping catalyst filter (27).

[Translation done.]